

Viscosity Measurements and Model Comparisons for the Refrigerant Blends R410A and R507A

A. Laesecke^{C,S}

National Institute of Standards and Technology (NIST)

Physical and Chemical Properties Division

325 Broadway

Boulder, Colorado 80305-3328, U.S.A.

Arno.Laesecke@Boulder.NIST.Gov

Wide-ranging viscosity measurements of the blends R410A (0.5 R32 + 0.5 R125 by mass) and R507A (0.5 R143a + 0.5 R125 by mass) were carried out in a torsional crystal viscometer at two subcritical and three supercritical isotherms between 300 and 420 K with pressures up to 68 MPa. Considerable conductances were observed in the blend that contains difluoromethane (R32). Therefore, reference viscosity measurements of the blend R410A were carried out at saturated liquid conditions between 240 K and 350 K with a sealed gravitational capillary viscometer because in that instrument the sample is not exposed to an electric field. The measurement results are compared with values estimated *via* the extended corresponding states model in NIST Standard Reference Database 23 (REFPROP, version 7) and with literature data. For both blends, the results obtained with the torsional crystal viscometer agree with the predicted viscosities within the estimated experimental uncertainty of the instrument at low sample conductances. They increase systematically with the sample conductance. The data for R410A obtained with the capillary viscometer agree with the estimated viscosities within their experimental uncertainty. Literature data deviations range from $\pm 18\%$ to 5% for this blend and from $\pm 9\%$ to 14% for R507A while the R507A-measurements of this work deviate from the model viscosities within $\pm 4\%$.